

Amend
described above, the upper structure of the manipulator (300) (the structure provided by frame 1 (120) and frames 2 (130) is affixed to a feed mechanism connection part (321) which is attached above the support member (320) of the carriage (310) via the Z axis shaft (620). As shown in Figure 3, this feed mechanism connection part (321) has formed therein an optical fiber insertion hole 322 for guiding the optical fiber (700) sent from the upper structure (not depicted in Figure 3) in the downward direction.

In the Claims:

Amend Claims 1, 3, 10, 19-24 as follows:

- Sub B1 Q2*
1. (Amended) An optical fiber wiring apparatus for wiring a substrate, comprising:
- a wheel-less wiring head which guides an optical fiber to a lead end thereof along a guide groove through which the optical fiber slides into position on the substrate, the guide groove extending partially along a length of the wiring head and forming an optical fiber path;
- an optical fiber feed means which feeds said optical fiber during the wiring operation into said optical fiber path of said wiring head;
- an optical fiber contacting means, which brings *the* ~~an~~ optical fiber, which has been guided to said lead end of said wiring head via said optical fiber path, and said wiring substrate into contact, wherein the optical fiber contacting means includes an optical fiber

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pressing means for pressing said optical fiber against said wiring substrate with a predetermined pressure;

an XY movement means, which moves said wiring substrate and said wiring head relative to one another in the X and Y directions in the state in which said optical fiber at said lead end of said wiring head has been placed in contact with said wiring substrate by said optical fiber contacting means; and

an optical fiber affixing means, which successively affixes, to said wiring substrate, said optical fiber which has been brought into contact with said wiring substrate during movement by said XY movement means.

Sub B3
3. (Amended) An optical fiber wiring apparatus in accordance with claim 1, wherein

at least a lead end of said wiring head has a hemispherical shape and the guide groove which guides said optical fiber in the hemispherical part,

a pressure groove is formed which is connected to said guide groove and extends to said hemispherical part, and

said optical fiber is guided to the lead end of said wiring head via said guide groove and said pressure groove.

10. (Amended) An optical fiber wiring apparatus in accordance with claim 9, wherein the predetermined pressure with which said optical fiber pressing means presses

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said optical fiber at ^a lead end of said wiring head against said wiring substrate is within a range of 9.8×10^{-2} (N) (10 gf) - 2.0 N (200 gf).

Sub B4
~~19. (Amended) An optical fiber wiring apparatus which lays optical fibers down on a wiring substrate, comprising:~~
~~a manipulator which is disposed in a plane which is approximately parallel to the surface of said wiring substrate in a movable manner, and which conducts the laying operation of the optical fibers on said wiring substrate, the manipulator comprising:~~
~~an optical fiber feed means for feeding an optical fiber;~~
~~a wheel-less wiring mechanism for wiring, onto said wiring substrate, said optical fiber fed by said optical fiber feed means, wherein the wiring mechanism includes an optical fiber pressing means for pressing said optical fiber against said wiring substrate with a predetermined pressure;~~
~~a Z axial rotation mechanism which rotates about an axis approximately perpendicular to the surface of said wiring substrate and thereby changes the orientation of the wiring of said wiring mechanism; and~~
~~an optical fiber cutting means which cuts optical fiber fed by said optical fiber feed means.~~

20. (Amended) An optical fiber wiring apparatus in accordance with claim 19, wherein

said wiring mechanism is disposed so as to be movable in a direction of approach to or separation from said wiring substrate, and said wiring mechanism includes a wiring plunger which presses said optical fiber against said wiring substrate by using said optical fiber pressing means while guiding said optical fiber in a predetermined orientation, and said optical fiber feed means and said wiring plunger are disposed so as to hold said optical fiber cutting means therebetween in the Z axial direction, and are disposed so as to be simultaneously rotatable by said Z axial rotation means.

21. (Amended) A wiring method which conducts the wiring of an optical fiber onto a wiring substrate, comprising:

adjusting the feeding of the optical fiber by an optical fiber feed means so that the tension on the optical fiber is within a fixed range;

wiring the optical fiber fed by the optical fiber feed means onto the wiring substrate by a wheel-less wiring mechanism while the optical fiber is guided along a guide groove formed in the wiring mechanism and is pressed against the wiring substrate with a predetermined pressure; and

cutting the optical fiber to a required length for the wiring by an optical fiber cutting means.

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22. (Amended) An optical fiber wiring method which employs an optical fiber wiring apparatus which is provided with a wiring substrate, a wheel-less wiring head which has a guide groove along which an optical fiber is guided, and applies an the optical fiber to said wiring substrate with a predetermined pressure, and an optical fiber feed means which feeds stocked optical fiber, which apparatus moves said wiring substrate and said wiring head relative to one another in the XY directions and conducts wiring operations which form a desired optical fiber wiring pattern on said wiring substrate, comprising;

feeding an optical fiber of predetermined length by said optical fiber feeding means, in a manner unrelated to the wiring, either before or after the wiring operation or both before and after the wiring operation, and thereby producing an optical wiring board having optical fibers of a predetermined length connected to said wiring pattern either before or after said wiring pattern by means of the wiring operation or both before and after said wiring pattern.

23. (Amended) An optical fiber wiring method which employs an optical fiber wiring apparatus which is provided with a wiring substrate, a wheel-less wiring head which is provided with an optical fiber path which guides an optical fiber to a lead end thereof and which applies said optical fiber guided to said lead end to said wiring substrate with a predetermined pressure, and an optical fiber feeding means which feeds stocked optical fiber, which apparatus moves said wiring substrate and said wiring head relative to one

another in the XY directions and conducts a wiring operation which forms a predetermined optical fiber wiring pattern on said wiring substrate, comprising:

at the initiation of wiring, moving said wiring head to a wiring initiation position,

and

in the state in which said optical fiber has been guided to said lead end of said wiring head along a guide groove formed in the wiring head, pressing said optical fiber against said wiring substrate with said predetermined pressure,

said wiring head is moved along said wiring pattern with respect to said wiring substrate, the required optical fiber is fed into said optical fiber path of said wiring head by said optical fiber feeding means, and wiring is conducted.

24. (Amended) An optical fiber wiring method in which an optical fiber is laid on a wiring substrate by a wheel-less wiring head, at least a lead end of which is formed with a spherical surface, which has formed in a side surface part thereof a guide groove which guides an optical fiber to said spherical surface part, and which has a pressure groove which extends from said guide groove to the top part of said spherical surface part, comprising;

at the initiation of wiring, moving said wiring head to a wiring initiation position:

fitting an optical fiber into said pressure groove;